

### Modeling and Optimization of Ship Transport of CO<sub>2</sub> Chain

이석구, 최고봉, 윤인섭, 이종민\*  
서울대학교  
(jongmin@snu.ac.kr\*)

Reducing CO<sub>2</sub> emission for mitigation of climate change has recently attracted much attention. Although several alternatives such as bio, hydrogen, and solar energy are being studied to meet the huge energy demand and alleviate the global warming problem, large amount of CO<sub>2</sub> emission seems to be inevitable in near future. Under the present conditions, Carbon Capture and Storage (CCS) is considered to be the most practical approach for mitigation of CO<sub>2</sub> emission. Previous CCS researches have mainly focused on efficient capture methods. However, there is a relative lack of studies on ship transport and offshore unloading. The available guidelines, if any, are simply suggested without a systematic analysis from the viewpoint of the comprehensive transport chain system. Thus, this study addresses the issue by modeling the ship-based transport chain of CO<sub>2</sub>. In particular, liquefaction, Boil-Off Gas (BOG) re-liquefaction and offshore unloading processes are investigated to provide essential guidelines in terms of an optimal operating condition. In addition, this study addresses the issue by formulating it as a multi-objective optimization problem that minimizes overall ship transport cost and other criteria.